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ART UNIT	PAPER NUMBER
2861	

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO 90C (Rev 10/03)

	Application No.	Applicant(s)
Office Action Summary	10/028,548	PIERSON, DALLAS K.
	Examiner	Art Unit
	Hai C Pham	2861

-- Th MAILING DATE f this communication app ars on th cov r she t with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>05 September 2003</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
     closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-34* is/are pending in the application.

     4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5,7-9,11-17,19,20 and 23-31* is/are rejected.

7)☒ Claim(s) *4,6,10,18,21,22 and 32-34* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

     a)☐ All b)☐ Some * c)☐ None of:

         1.☐ Certified copies of the priority documents have been received.

         2.☐ Certified copies of the priority documents have been received in Application No. _____.

         3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
     application from the International Bureau (PCT Rule 17.2(a)).

     * See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application)
     since a specific reference was included in the first sentence of the specification or in an Application Data Sheet.
     37 CFR 1.78.

     a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific
     reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)   4)☐ Interview Summary (PTO-413) Paper No(s). _____.

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)   5)☐ Notice of Informal Patent Application (PTO-152)

3)☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.   6)☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 112

1.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2.   Claim 26 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- Claim 26 recites the following limitation "the spatial frequency is greater than the spatial frequency of neighboring halftone dots", which appears to be unclear in that it is not known which spatial frequency is being compared to that of the neighboring halftone dots. However, claim 26 will be examined based on the similar recitation of the claimed element in claim 4.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4.   Claims 19-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Spurr et al. (U.S. 6,064,170).

Spurr et al. discloses a laser thermal printing apparatus and method for recording image on a thermally sensitive medium (thermal print medium 32) (col. 12, lines 15-28), the method comprising printing a swath on the thermally sensitive medium (32) as a function of a set of data, and varying the breadth of the swath during printing (col. 9, line 66 to col. 10, line 3). With regard to claim 31, Spurr et al. teaches the printhead (500) directing the thermal energy from the set of laser diodes (402) causing the dye donor sheet (36) to pass the desired color to the thermal print medium or receiver sheet (32).

With regard to claim 20, Spurr et al. further teaches varying the breadth of the swath comprises contracting the breadth of the swath and expanding the breadth of the swath (varying the width of the swath based on writing with different number of channels or laser diodes) (col. 9, line 66 to col. 10, line 3).

Claim Rejections - 35 USC § 103

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6.   Claims 1-3, 5, 7-9, 11-17, 23-24, 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yen et al. (U.S. 5,992,962) in view of Klassen et al. (U.S. 5,677,714).

Yen et al., an acknowledge prior art, discloses print masks for inkjet printers, the print masks having triangular patterns formed by solid black dots (or printed dots) and

open dots (or absence of dots), the open dots corresponding to the nozzles being turned

off while the solid black dots correspond to the nozzles being activated to print dots so as

a multipass staggered-swath printing is performed. Yen et al. teaches the print mask

comprising a first set of first patterns (solid black dots), a second set of first patterns, a

set of second patterns (open dots), wherein the first set of first patterns is spatially

clustered in a first triangle-like shape (the clustered solid black dots of the upper half of

the mask pattern unit 60 having a triangle-like shape) (Fig. 6) and the second set of first

patterns (the clustered solid black dots of the upper half of the *adjacent* mask pattern unit

60) is spatially clustered in a second triangle-like shape. With regard to claims 12, 16,

Yen et al. discloses the print mask having a plurality of subset masks (plurality of mask

pattern units 60).

With regard to claims 2, 13, although Yen et al. does not explicitly teach that the

solid black dots and open dots constitute sets of first and second logical values, e.g.

binary "1" and "0" values, Yen et al. does however indicate that the print masks can be

implemented as either a hardware or software driver to drive the print head, e.g., open

(activate) or muffle (deactivate) the various nozzles. It is well known in the art that such

software-driven print masks include a matrix set of logical values of "1" and "0", to

determine whether the pixel is turned OFF or turned ON as evidenced by Klassen et al.,

which discloses a print mask (300, Fig. 8) as a software-generated mask or performed by

hardware logic, the print mask being composed of logical 1 and logical 0, which

determine the ON state and OFF state of the specific pixel, respectively, and thus

determine the activation and deactivation of the specific nozzle of the ink jet printer,

respectively (col. 4, line 52 to col. 5, line 4).

It would have been obvious at the time the invention was made to a person having

ordinary skill in the art to implement the print mask of Yen et al. to have binary values as

taught by Klassen et al. since it was known in the printing art that a software-driven print

mask is composed of logical values of 1's and 0's.

On the other hand, it is noted that the intended use statement in each of the claims

1, 12, 16, 23, 27 implies no apparent structure of the mask being specifically configured

to be adapted for use in a laser thermal printer. The mask as claimed may be applied to a

variety of technological fields besides a laser thermal printer and thus the recitation of a

laser thermal printer in relation to the mask does not limit the structure of the mask itself.

The intended use must result in a structural difference between the claimed invention and

the prior art in order to patentably distinguish the claimed invention from the prior art.

(MPEP 2111.02).

Yen et al. further teaches:

- the print mask extending in a first (horizontal or row) direction, wherein the first set

  of first patterns (or solid black dots) is spatially proximate (e.g., adjacent) to the

  second set of first patterns (or open dots) in the first direction (repeated triangular

  4 by 4 patterns of open dots and solid black dots) (**referring to claims 3, 14, 17**),

- the mask extending in the first (horizontal or row) and second (vertical or column)

  directions, wherein the first and second triangle-like shapes include a base (the

  horizontal side of the triangular first patterns) and a peak (the opposite vertex of

  the triangular first patterns), the base being oriented in the first direction (horizontal

  direction), and the base of the first triangle-like shape being spatially proximate to

  the peak of the second triangle-like in the second direction (**referring to claim 5**),

- the set of second patterns (or open dots) being spatially clustered in a third triangle-like shape **(referring to claims 7, 15)**,

- the first and second triangle-like shapes (adjacent triangular patterns of solid black dots) having a first orientation and the third triangle-like shape (triangular patterns of open dots) having an orientation that is inverted relative to the first orientation (see Fig. 6) **(referring to claim 8)**,

- the boundary between the set of the second patterns (or open dots) and the first and second sets of the first patterns (or solid black dots) being an irregular zigzag (the boundary between the patterns of the solid black dots and that of the open dots within the mask pattern unit 60 is not smooth, and forms an irregular zigzag) (Fig. 6) **(referring to claim 9)**,

- the mask being stored in a computer-readable data file (software generated print mask) **(referring to claim 11)**.

The method claims 23, 24, 27-28 are deemed to be clearly anticipated by functions of the above structures

7.   Alternatively, claims 1-3, 5, 7-9, 11-17, 23-25, 27-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yen et al. in view of Kanematsu et al. (U.S. 6,183,055 B1).

Yen et al. discloses print masks for inkjet printers, the print masks having triangular patterns formed by solid black dots (or printed dots) and open dots (or absence of dots), the open dots corresponding to the nozzles being turned off while the solid black

dots correspond to the nozzles being activated to print dots so as a multipass staggered-swath printing is performed. Yen et al. teaches the print mask comprising a first set of first patterns (solid black dots), a second set of first patterns, a set of second patterns (open dots), wherein the first set of first patterns is spatially clustered in a first triangle-like shape (the clustered solid black dots of the upper half of the mask pattern unit 60 having a triangle-like shape) (Fig. 6) and the second set of first patterns (the clustered solid black dots of the upper half of the *adjacent* mask pattern unit 60) is spatially clustered in a second triangle-like shape. With regard to claims 12, 16, Yen et al. discloses the print mask having a plurality of subset masks (plurality of mask pattern units 60).

With regard to claims 2, 13, although Yen et al. does not explicitly teach that the solid black dots and open dots constitute sets of first and second logical values, e.g. binary "1" and "0" values, Yen et al. does however indicate that the print masks can be implemented as either a hardware or software driver to drive the print head, e.g., open (activate) or muffle (deactivate) the various nozzles. It is well known in the art that such software-driven print masks include a matrix set of logical values of "1" and "0", to determine whether the pixel is created or not as evidenced by Kanematsu et al., which discloses a print mask as a software-generated mask (random mask creating means 1008, Fig. 10), the print mask being composed of logical value 1 and logical value 0 (Figs. 5B-5D), which determine the ON state and OFF state of the specific pixel, respectively, by executing the logical AND operation between the bit map image data and the mask (col. 9, line 15 to col. 10, line 67).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to implement the print mask of Yen et al. to have binary values as

taught by Kanematsu et al. since it was known in the printing art that a software-driven mask is constituted by logical values of 1's and 0's.

With regard to claims 25, 29, 30, Yen et al. fails to teach the logical values of the mask being a function of a random element, the step of printing on a laser thermal printer as a function of image data and the mask.

Regardless, Kanematsu et al. teaches the software-driven mask being created based on a random number (Fig. 5A) for generating the logical values 1s and 0s of the random mask (Figs. 5B-5D). Kanematsu et al. further teaches the above software-driven mask being applicable to different types of recording techniques including the ink jet and laser thermal printing engines (col. 16, lines 23-29).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate a software-driven random mask suitable for all types of printing engines as taught by Kanematsu et al. in the device of Yen et al. The motivation for doing so would have been to provide a flexible masking rate of the image data adapted to the recording apparatus.

Yen et al. further teaches:

- the print mask extending in a first (horizontal or row) direction, wherein the first set of first patterns (or solid black dots) is spatially proximate (e.g., adjacent) to the second set of first patterns (or open dots) in the first direction (repeated triangular 4 by 4 patterns of open dots and solid black dots) (**referring to claims 3, 14, 17**),

- the mask extending in the first (horizontal or row) and second (vertical or column) directions, wherein the first and second triangle-like shapes include a base (the horizontal side of the triangular first patterns) and a peak (the opposite vertex of

the triangular first patterns), the base being oriented in the first direction (horizontal

direction), and the base of the first triangle-like shape being spatially proximate to

the peak of the second triangle-like in the second direction **(referring to claim 5),**

- the set of second patterns (or open dots) being spatially clustered in a third

   triangle-like shape **(referring to claims 7, 15),**

- the first and second triangle-like shapes (adjacent triangular patterns of solid black

   dots) having a first orientation and the third triangle-like shape (triangular patterns

   of open dots) having an orientation that is inverted relative to the first orientation

   (see Fig. 6) **(referring to claim 8),**

- the boundary between the set of the second patterns (or open dots) and the first

   and second sets of the first patterns (or solid black dots) being an irregular zigzag

   (the boundary between the patterns of the solid black dots and that of the open

   dots within the mask pattern unit 60 is not smooth, and forms an irregular zigzag)

   (Fig. 6) **(referring to claim 9),**

- the mask being stored in a computer-readable data file (software generated print

   mask) **(referring to claim 11).**

The method claims 23, 24, 27-28 are deemed to be clearly anticipated by functions of

the above structures

Allowable Subject Matter

8.   Claims 4, 6, 10, 18, 21-22, 25, 32-34 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9.   Claim 26 would be allowable if rewritten to overcome the rejection under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

10.   The following is a statement of reasons for the indication of allowable subject matter:

The primary reason for the indication of the allowability of the claimed invention, with respect to claim 4 and 26, is the inclusion of the limitation "wherein the spatial frequency of the first set of the first patterns spatially clustered in the first triangle-like shape and the second set of the first patterns spatially clustered in the second triangle-like shape is greater than the spatial frequency of neighboring halftone pixels", in the combination as currently claimed, which is not found taught or fairly suggested by the prior arts made of record, considered alone or in combination.

The primary reason for the indication of the allowability of the claimed invention, with respect to claims 6 and 18, is the inclusion of the limitation "wherein the peaks are unaligned in the second direction", in the combination as currently claimed, which is not found taught or fairly suggested by the prior arts made of record, considered alone or in combination.

The primary reason for the indication of the allowability of the claimed invention, with respect to claim 10, is the inclusion of the limitation "wherein the first triangle-like

shape is selected from a group consisting of a semicircular shape, a sinusoidal shape, a trapezoidal shape and a pentagonal shape", in the combination as currently claimed, which is not found taught or fairly suggested by the prior arts made of record, considered alone or in combination.

The primary reason for the indication of the allowability of the claimed invention, with respect to claims 21 and 34, is the inclusion of the limitation "wherein varying the breadth of the swath comprises irregularly contracting the breadth of the swath and irregularly expanding the breadth of the swath", in the combination as currently claimed, which is not found taught or fairly suggested by the prior arts made of record, considered alone or in combination.

The primary reason for the indication of the allowability of the claimed invention, with respect to claims 22 and 32, is the inclusion of the limitation "wherein varying the breadth of the swath comprises varying the breadth of the swath as a function of the set of data and a mask", in the combination as currently claimed, which is not found taught or fairly suggested by the prior arts made of record, considered alone or in combination.

The primary reason for the indication of the allowability of the claimed invention, with respect to claim 25, is the inclusion of the limitation "wherein the second subset of contiguous first logical values is further a function of a random element", in the combination as currently claimed, which is not found taught or fairly suggested by the prior arts made of record, considered alone or in combination.

Claim 33 is allowed because it is directly dependent from claim 32 above.

Response to Arguments

11.   Applicant's arguments filed 09/05/03 have been fully considered but they are not persuasive.

12.   With regard to Applicant's argument that a prima facie of obviousness is not established, the examiner respectfully disagrees. In fact, it is prima facie obvious to combine two elements each of which is taught by the prior art to be useful for the same purpose. The idea of combining them flows logically from their having been individually taught in the prior art." In re Kerkhoven, 626 F.2d 846, 205 USPQ 1069, 1072 (CCPA 1980). Indeed, Yen et al. and Serra (U.S. 6,067,405) (previously cited) and Klassen et al. (currently cited), each teaches similar software-driven print mask used in an ink jet printer, wherein Yen et al. teaches the particular pattern arrangement as claimed, which is used to activate and deactivate the nozzles in accordance with the patterns without explicitly detailing the logical values the define the software-driven print mask. Serra and now Klassen et al., each teaches the constituents of the similar software-driven print mask for activating and deactivating the nozzles of the ink jet printhead in accordance with the logical values of the patterns. Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to implement the print mask of Yen et al. to have binary values as taught by Serra (previously cited) or Klassen et al. (currently cited) since it was known in the printing art that a software-driven print mask is constituted by logical values of 1's and 0's.

Moreover, Applicant acknowledges the well-known general structure of a print mask similar to that being taught by either Serra or Klassen et al. at paragraph [0014]:

... In general, a mask is a set of logical `0` values and logical `1` values. The lasers in the array are individually modulated as a function of the image data and the mask. Depending upon whether a value is a logical `0` value or a logical `1` value, a laser in the imaging array is either enabled or deactivated. In this way, masking involves printing a fraction of the pixels.

In response to Applicant's argument that the Examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgement on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. *In re McLaughlin*, 443 F.2d 1392; 170 USPQ 209 (CCPA 1971).

In other words, in contrast to Applicant's assertions, the examiner has met all the burdens as a matter of law.

With regard to Applicant's argument that neither Yen et al. and Serra "disclose a mask for a laser thermal printer, it is noted that the recitation of the mask for use in a laser thermal printer in the preamble constitutes the intended used of the mask. Such intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. In re Casey,152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963). In this case, the prior art structure of the software-driven print mask as taught by Yen et al., Serra, and Klassen et al. is capable of

performing the intended use, namely performing the activation and/or deactivation of each of the printing elements of the printhead.

Applicant further argues that none of the prior art mentions "about one printing element affecting a neighboring printing element", or "the effect of heat generated by one laser upon neighbor lasers". The examiner respectfully submits that the claimed structure of the mask does neither distinguish itself from that of the prior art nor provide a clear advantage as compared to the well-known mask cited in the prior art such that the above problems can be alleviated.

With regard to Applicant's argument concerning that Yen et al. "makes no reference to logical values in general, or to logical "1" values in particular" and 'does not describe any digital processing that takes place during inkjet printing", the examiner respectfully submits that the description of the mask pattern of black dots and open dots being generated by software logic or hardware logic that turns on (activates) or muffles (deactivates) the printing nozzles, respectively, implies that the mask pattern would be a logical value as known in the conventional art.

With regard to the claimed elements as recited in the dependent claims 3-5, 7-9, 11, 13-15, 17, 24, 26, 28-30, please refer to the rejection in paragraph 4 above, which explains how the claims are read into the prior art.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai C Pham whose telephone number is (703) 308-1281. The examiner can normally be reached on T-F (8:30-5:30).

   If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Stephen D. Meier can be reached on (703) 308-4896. The fax phone

numbers for the organization where this application or proceeding is assigned are (703)

308-7722, (703) 308-7724, (703) 308-7382, (703) 305-3431, (703) 305-3432.

   Any inquiry of a general nature or relating to the status of this application or

proceeding should be directed to the receptionist whose telephone number is (703) 308-

0956.

HAI PHAM
PRIMARY EXAMINER

January 15, 2004